

WHAT IS CLAIMED IS:

1. A pattern formation method comprising the steps of:

forming a resist film;

performing pattern exposure by selectively irradiating said resist film with

5 exposing light while supplying, onto said resist film, a nonaqueous solution including water; and

forming a resist pattern by developing said resist film after the pattern exposure.

2. A pattern formation method comprising the steps of:

forming a positive resist film of a chemically amplified resist material including

10 an acid generator for generating an acid through irradiation with light;

performing pattern exposure by selectively irradiating said resist film with

exposing light while supplying, onto said resist film, a nonaqueous solution including a compound for generating water in the presence of an acid; and

forming a resist pattern by developing said resist film after the pattern exposure.

15 3. The pattern formation method of Claim 2,

wherein said chemically amplified resist material includes a compound for generating water in the presence of an acid.

4. A pattern formation method comprising the steps of:

forming a positive resist film;

20 performing pattern exposure by selectively irradiating said resist film with

exposing light while supplying, onto said resist film, a nonaqueous solution including an acid generator for generating an acid through irradiation with light and a compound for generating water in the presence of an acid; and

forming a resist pattern by developing said resist film after the pattern exposure.

25 5. A pattern formation method comprising the steps of:

forming a positive resist film of a chemically amplified resist material including an acid generator for generating an acid through irradiation with light;

forming, on said resist film, a water-soluble film including a compound for generating water in the presence of an acid;

5 performing pattern exposure by selectively irradiating said resist film with exposing light while supplying a nonaqueous solution onto said water-soluble film; and forming a resist pattern by developing said resist film after the pattern exposure.

6. The pattern formation method of Claim 5,

wherein said nonaqueous solution includes a compound for generating water in the presence of an acid.

7. The pattern formation method of Claim 5,

wherein said chemically amplified resist material includes a compound for generating water in the presence of an acid.

8. A pattern formation method comprising the steps of:

15 forming a positive resist film;

forming, on said resist film, a water-soluble film including an acid generator for generating an acid through irradiation with light and a compound for generating water in the presence of an acid;

performing pattern exposure by selectively irradiating said resist film with exposing light while supplying a nonaqueous solution onto said water-soluble film; and forming a resist pattern by developing said resist film after the pattern exposure.

9. The pattern formation method of Claim 8,

wherein said nonaqueous solution includes a compound for generating water in the presence of an acid.

25 10. A pattern formation method comprising the steps of:

forming a positive resist film of a chemically amplified resist material including an acid generator for generating an acid through irradiation with light and a compound for generating water in the presence of an acid;

performing pattern exposure by selectively irradiating said resist film with exposing light while supplying a nonaqueous solution onto said resist film; and forming a resist pattern by developing said resist film after the pattern exposure.

11. The pattern formation method of Claim 10,

wherein said nonaqueous solution includes a compound for generating water in the presence of an acid.

12. The pattern formation method of any of Claims 1, 2, 4, 5, 8 and 10, wherein said nonaqueous solution is perfluoropolyether.

13. The pattern formation method of any of Claims 1, 2, 4, 5, 8 and 10, wherein said exposing light is F₂ laser.

14. The pattern formation method of any of Claims 2, 4, 5, 8 and 10, wherein water is added to said nonaqueous solution.

15. The pattern formation method of any of Claims 2, 4, 5, 8 and 10, wherein said acid generator is an onium salt, a halogen-containing compound, a diazoketone compound, a diazomethane compound, a sulfone compound, a sulfonic ester compound or a sulfonimide compound.

16. The pattern formation method of any of Claims 2, 4, 5, 8 and 10, wherein said acid generator is an onium salt selected from the group consisting of diphenyliodonium triflate, triphenylsulfonium triflate and triphenylsulfonium nonaflate.

17. The pattern formation method of any of Claims 2, 4, 5, 8 and 10,

wherein said acid generator is a halogen-containing compound selected from the

group consisting of 2-phenyl-4,6-bis(trichloromethyl)-s-triazine and 2-naphthyl-4,6-

bis(trichloromethyl)-s-triazine.

18. The pattern formation method of any of Claims 2, 4, 5, 8 and 10,
wherein said acid generator is a diazoketone compound selected from the group
consisting of 1,3-diphenyldiketo-2-diazopropane, 1,3-dicyclohexyldiketo-2-diazopropane
5 and an ester of 1,2-naphthoquinonediazido-4-sulfonic acid and 2,2,3,4,4'-
tetrahydroxybenzophenone.

19. The pattern formation method of any of Claims 2, 4, 5, 8 and 10,
wherein said acid generator is a diazomethane compound selected from the group
consisting of bis(trifluoromethylsulfonyl)diazomethane,
10 bis(cyclohexylsulfonyl)diazomethane, bis(phenylsulfonyl)diazomethane, bis(p-
tolylsulfonyl)diazomethane and bis(p-chlorophenylsulfonyl)diazomethane.

20. The pattern formation method of any of Claims 2, 4, 5, 8 and 10,
wherein said acid generator is a sulfone compound selected from the group
consisting of 4-trisphenacylsulfone, mesitylphenacylsulfone and
15 bis(phenylsulfonyl)methane.

21. The pattern formation method of any of Claims 2, 4, 5, 8 and 10,
wherein said acid generator is a sulfonic ester compound selected from the group
consisting of benzoin tosylate, 2,6-dinitrobenzyl tosylate, 2-nitrobenzyl tosylate, 4-
nitrobenzyl tosylate and pyrogallol trimesylate.

20 22. The pattern formation method of any of Claims 2, 4, 5, 8 and 10,
wherein said acid generator is a sulfonimide compound selected from the group
consisting of N-(trifluoromethylsulfonyloxy)succinimide, N-
(trifluoromethylsulfonyloxy)phthalimide, N-
(trifluoromethylsulfonyloxy)diphenylmaleimide, N-
25 (trifluoromethylsulfonyloxy)bicyclo[2.2.1]hepto-5-en-2,3-dicarboxylimide, N-

(trifluoromethylsulfonyloxy)-7-oxabicyclo[2.2.1]hepto-5-en-2,3-dicarboxylimide, *N*-
(trifluoromethylsulfonyloxy)bicyclo[2.2.1]heptane-5,6-oxy-2,3-dicarboxylimide, *N*-
(trifluoromethylsulfonyloxy)naphthyldicarboxylimide, *N*-
(camphorsulfonyloxy)succinimide, *N*-(camphorsulfonyloxy)phthalimide, *N*-
5 (camphorsulfonyloxy)diphenylmaleimide, *N*-(camphorsulfonyloxy)bicyclo[2.2.1]hepto-5-
en-2,3-dicarboxylimide, *N*-(camphorsulfonyloxy)-7-oxabicyclo[2.2.1]hepto-5-en-2,3-
dicarboxylimide, *N*-(camphorsulfonyloxy)bicyclo[2.2.1]heptane-5,6-oxy-2,3-
dicarboxylimide, *N*-(camphorsulfonyloxy)naphthyldicarboxylimide, *N*-(4-
methylphenylsulfonyloxy)succinimide, *N*-(4-methylphenylsulfonyloxy)phthalimide, *N*-(4-
10 methylphenylsulfonyloxy)diphenylmaleimide, *N*-(4-
methylphenylsulfonyloxy)bicyclo[2.2.1]hepto-5-en-2,3-dicarboxylimide, *N*-(4-
methylphenylsulfonyloxy)-7-oxabicyclo[2.2.1]hepto-5-en-2,3-dicarboxylimide, *N*-(4-
methylphenylsulfonyloxy)bicyclo[2.2.1]heptane-5,6-oxy-2,3-dicarboxylimide and *N*-(4-
methylphenylsulfonyloxy)naphthyldicarboxylimide.

15 23. The pattern formation method of any of Claims 2 through 11,
wherein said compound is a tertiary alcohol, a diol of a tertiary alcohol, a
secondary alcohol or a diol of a secondary alcohol.

24. The pattern formation method of any of Claims 2 through 4 and 6 through
11,

20 wherein said compound is a tertiary alcohol selected from the group consisting of
t-butanol and 2-methyl-2-butanol.

25. The pattern formation method of any of Claims 2 through 11,
wherein said compound is a diol of a tertiary alcohol selected from the group
consisting of 3-methyl-1,3,-butandiol and benzopinacol.

25 26. The pattern formation method of any of Claims 2 through 11,

wherein said compound is a secondary alcohol selected from the group consisting of 2-propanol, 2-butanol and 2-methyl-3-butanol.

27. The pattern formation method of any of Claims 2 through 11,

wherein said compound is a diol of a secondary alcohol selected from the group
5 consisting of 3-methyl-1,2-butandiol and 2,4-pentanediol.

28. The pattern formation method of Claim 5 or 8,

wherein said water-soluble film is a polyvinyl alcohol film or a polyvinyl
pyrrolidone film.